4.4 Rational Function

$$y = \frac{P(x)}{Q(x)} \qquad \frac{x+1}{x+2}$$

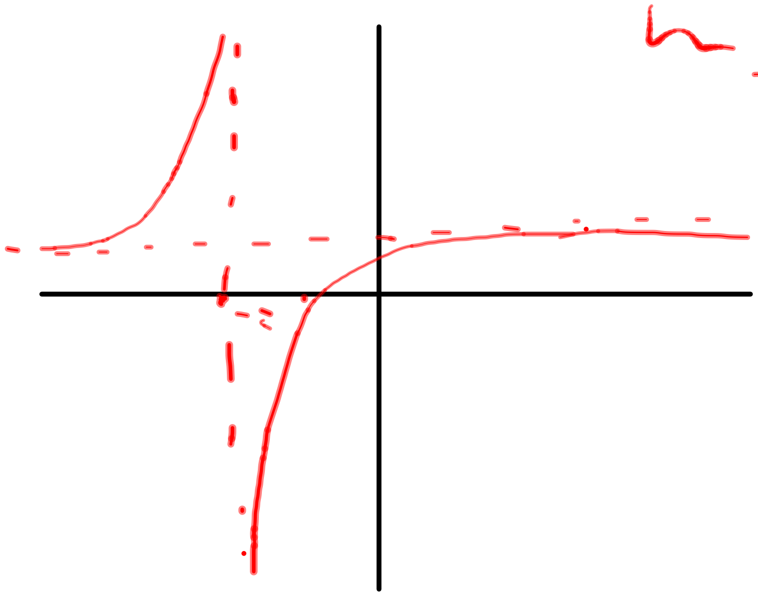
endish behavior $\quad (x+1)/(x+2)$

horizontal asymptote

domain restrictions

holes or vertical asymptotes

start w/ denom $=0$

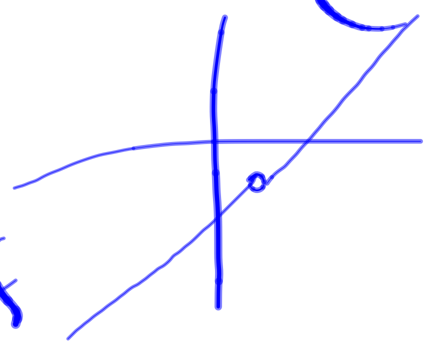


sketch a graph of

$$\frac{x^2-3x+2}{(x-1)}$$

$x=1$

$$= \frac{(x-2)(x-1)}{(x-1)^2}$$



denominator = 0

$x=a$

numerator = 0 at $x=a$

no

asymptote

multiplicity of root in numerator

< mult(root) in denom

= vert asymp

$\geq$ mult(root) in denom

= hole

horizontal asymptote

$$y = \frac{P(x)}{Q(x)}$$

If PollyNomial end behavior MATCHES end behavior of leading term

$$\underbrace{\text{endish}\left(\frac{x+1}{x+2}\right)} = \text{endish}\left(\frac{x}{x}\right)$$

$$= \text{endish}(1)$$

$$\text{endish}\left(\frac{x^2-3x+2}{x-1}\right) = \text{endish}\left(\frac{x^2}{x}\right)$$

$$= x$$